

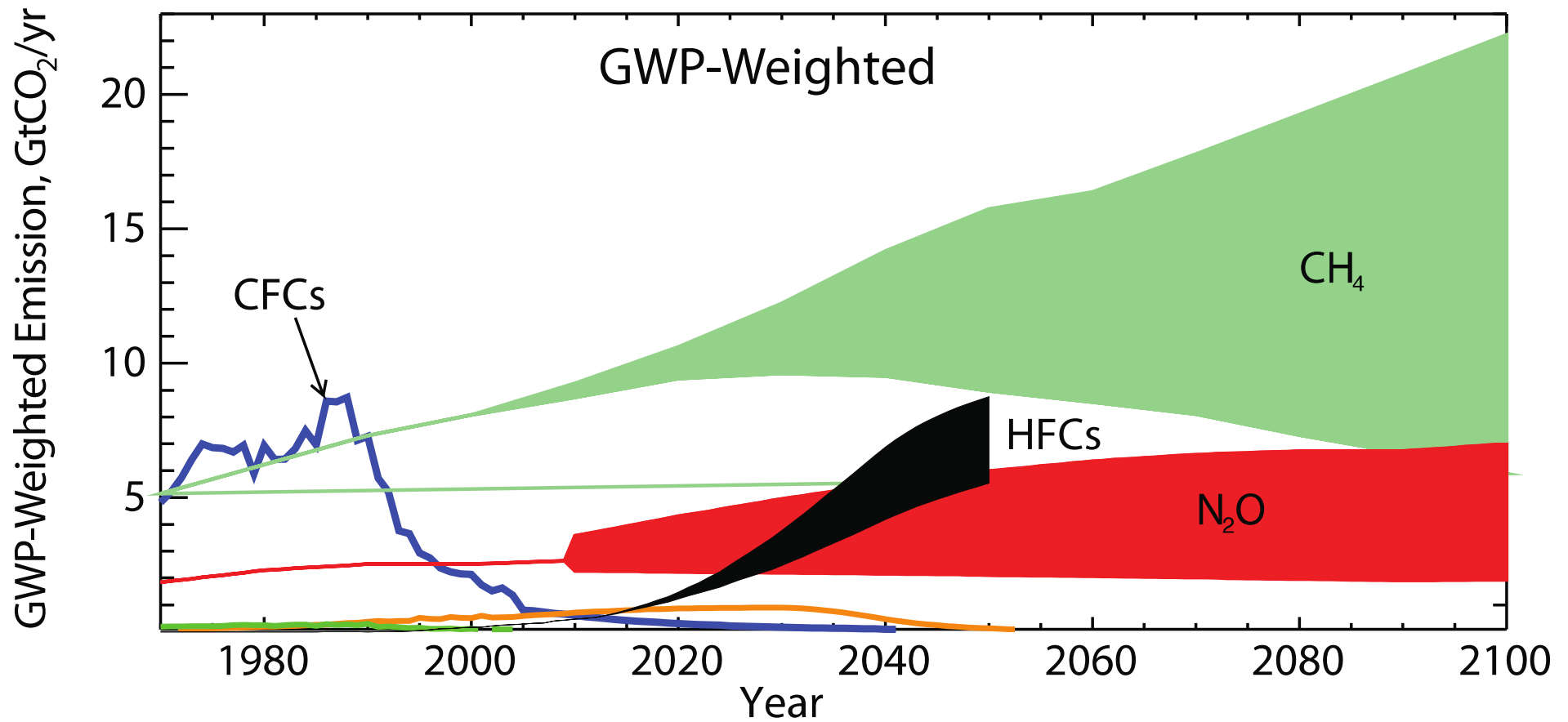


# Nitrous oxide's ozone destructiveness under different climate scenarios

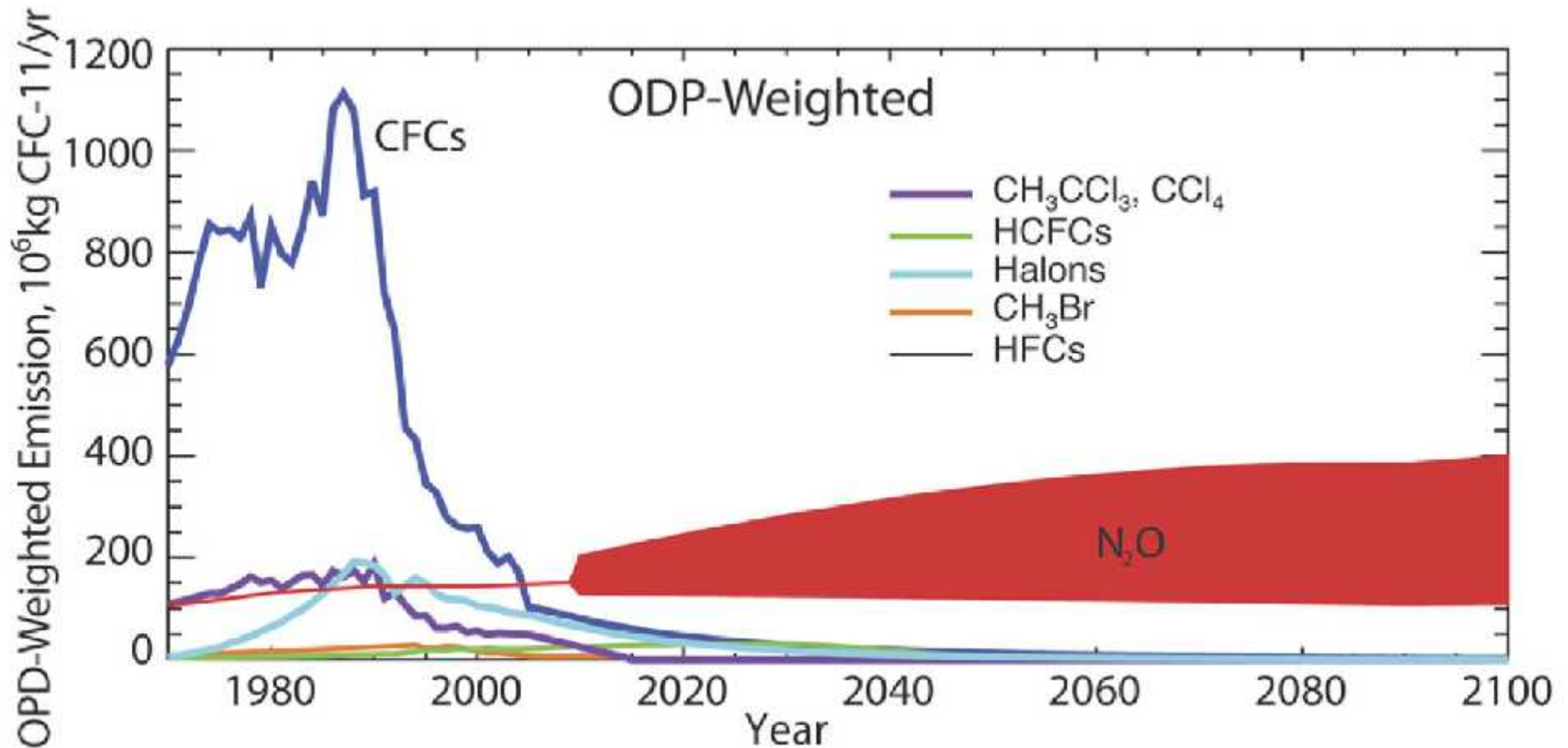
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# N<sub>2</sub>O: A climate threat



# A stratospheric ozone threat



## Earth's Ozone Shield May Be Imperiled By More Fertilizer Use, Scientist Says

By JERRY E. BISHOP Staff Reporter of THE WALL STREET JOURNAL

*Wall Street Journal* (1923 - Current file); Nov 13, 1975;

ProQuest Historical Newspapers: The Wall Street Journal (1889-1994)

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# Earth's Ozone Shield May Be Imperiled By More Fertilizer Use, Scientist Says

By JERRY E. BISHOP

Staff Reporter of THE WALL STREET JOURNAL

ANN ARBOR, Mich. — The earth's protective shield of ozone high in the atmosphere may be imperiled by man's increasing use of chemical fertilizers as well as by his use of aerosol sprays, a Harvard University scientist suggested.

The ozone layer, composed of heavy molecules of oxygen, lies about 20 miles up and is what prevents some of the sun's more harmful ultraviolet rays from reaching the earth's surface. There is considerable concern and a raging controversy over theories that certain human activities are releasing chemicals that are damaging the ozone layer. If the ozone layer is thinned out, it's argued, there will be a rise in ultraviolet radiation reaching the surface, causing an increase in skin cancer and as yet-unknown effects on plants, animals and weather.

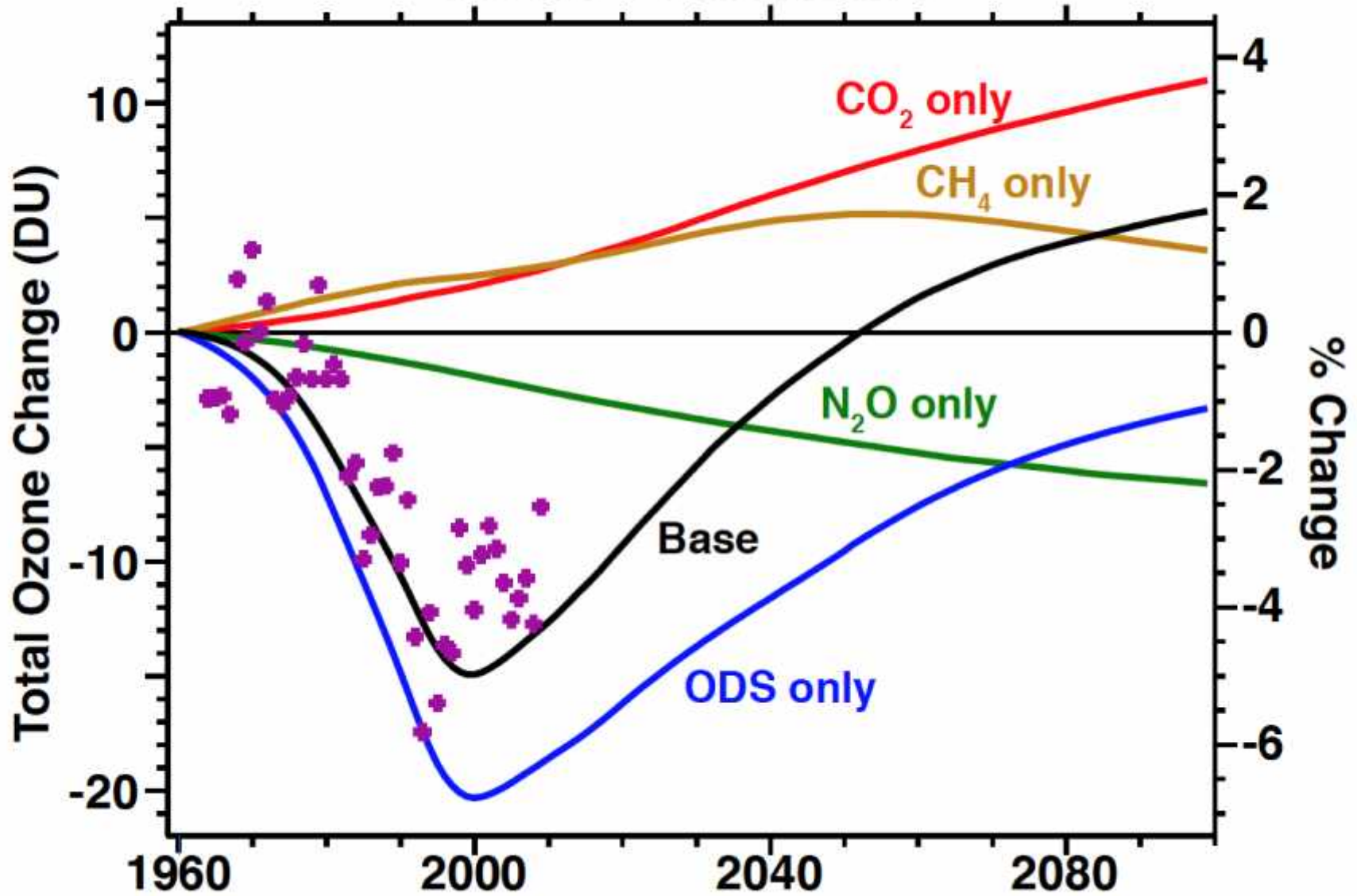
The controversy has focused largely on an argument that the man-made gases released in vast quantities by many pressur-

and started extracting too much nitrogen from the atmosphere, the natural denitrification process to return the nitrogen would be stepped up. In the process, the ozone layer would be decreased, permitting more of the destructive ultraviolet radiation to reach the surface and bring plant life under check, restoring the balance.

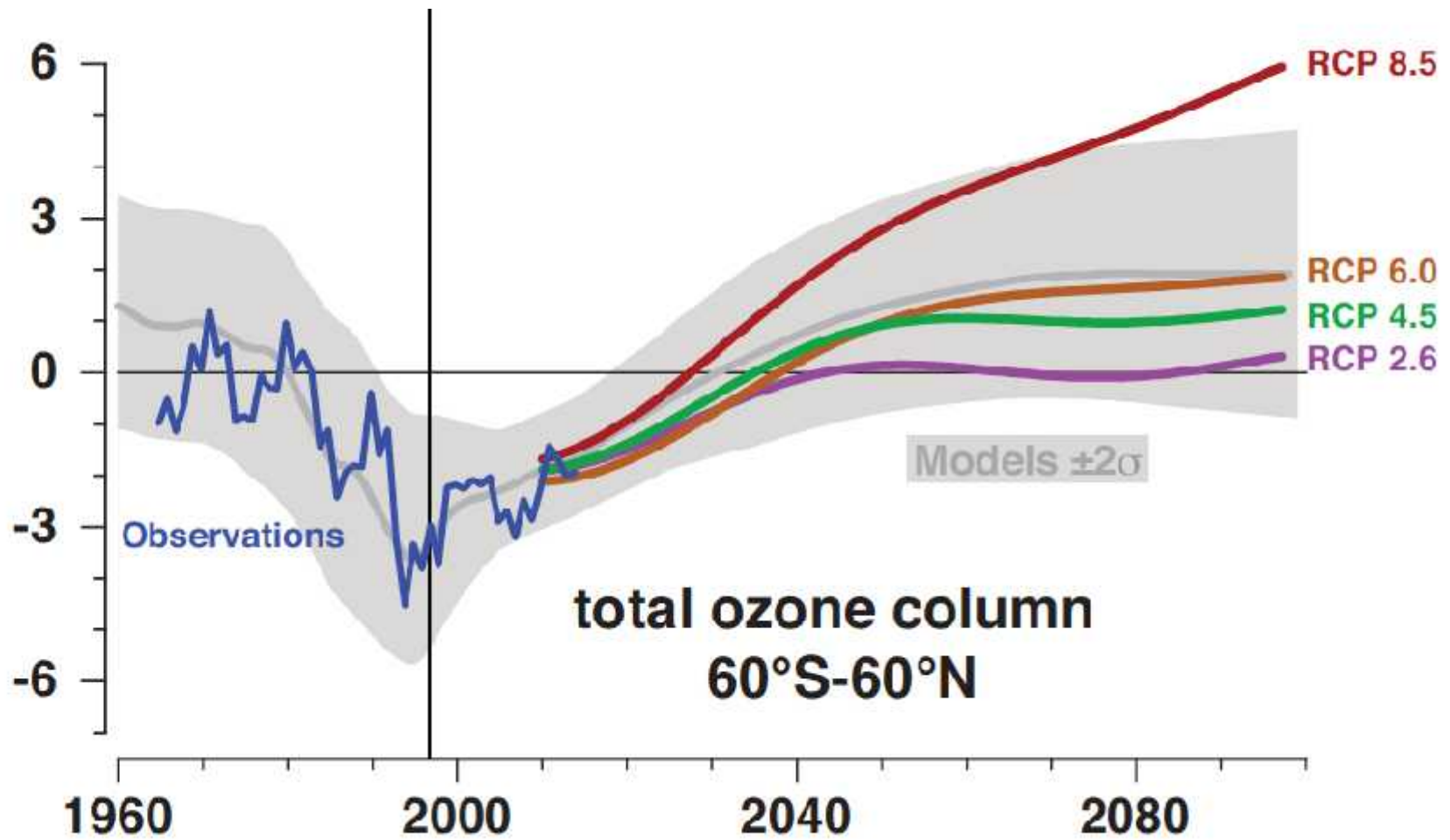
The new factor, Mr. McElroy argued, is the massive manufacture and use of man-made nitrogen fertilizers. To make the fertilizers, such as the nitrogen-rich ammonia fertilizers, the chemical factories extract nitrogen from the air. This nitrogen, of course, eventually goes into plant life.

Man currently is extracting nitrogen from the air and putting it into plants on a scale rivaling nature, Mr. McElroy said. Nitrogen for fertilizers jumped to 40 million tons a year in 1974 from one million tons in 1950. Production of nitrogen fertilizers by the year 2000 will reach 200 million tons a year, he said, equaling the amount extracted from the air by nature. In other

# Global Total Ozone

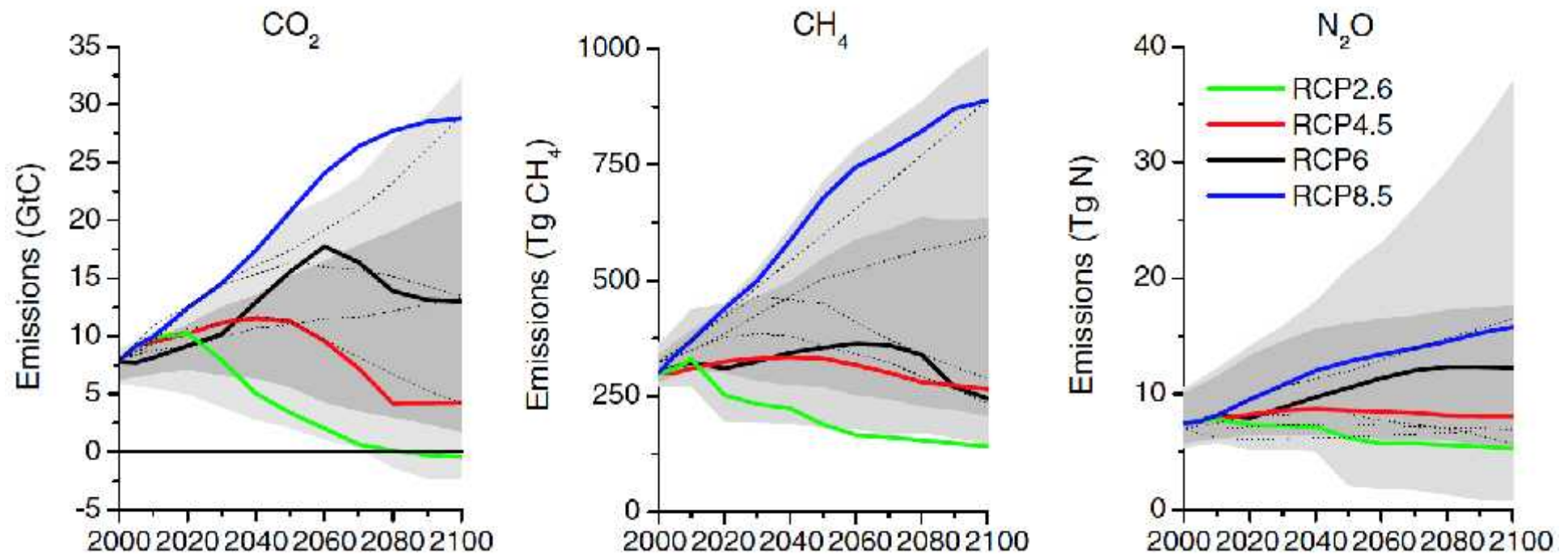


Total Ozone Column Change (%)



total ozone column  
60°S-60°N

# A range of climate futures

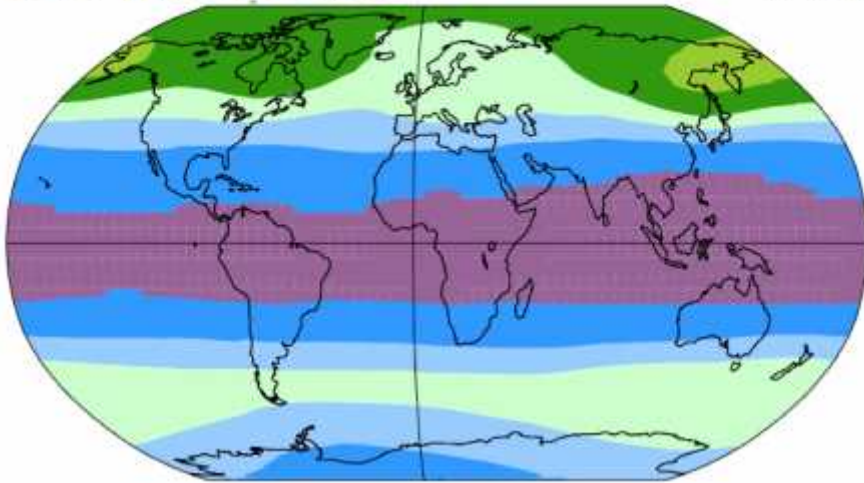


<b>Experiment</b>	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>
1	RCP 2.6	RCP 2.6
2	RCP 2.6	RCP 4.5
3	RCP 2.6	RCP 6.0
4	RCP 2.6	RCP 8.5
5	RCP 4.5	RCP 2.6
6	RCP 4.5	RCP 4.5
7	RCP 4.5	RCP 6.0
8	RCP 4.5	RCP 8.5
9	RCP 6.0	RCP 2.6
10	RCP 6.0	RCP 4.5
11	RCP 6.0	RCP 6.0
12	RCP 6.0	RCP 8.5
13	RCP 8.5	RCP 2.6
14	RCP 8.5	RCP 4.5
15	RCP 8.5	RCP 6.0
16	RCP 8.5	RCP 8.5

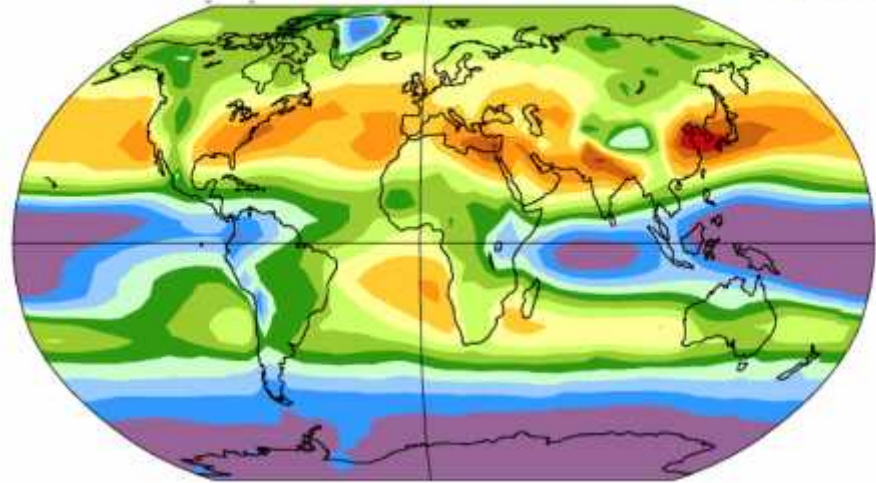


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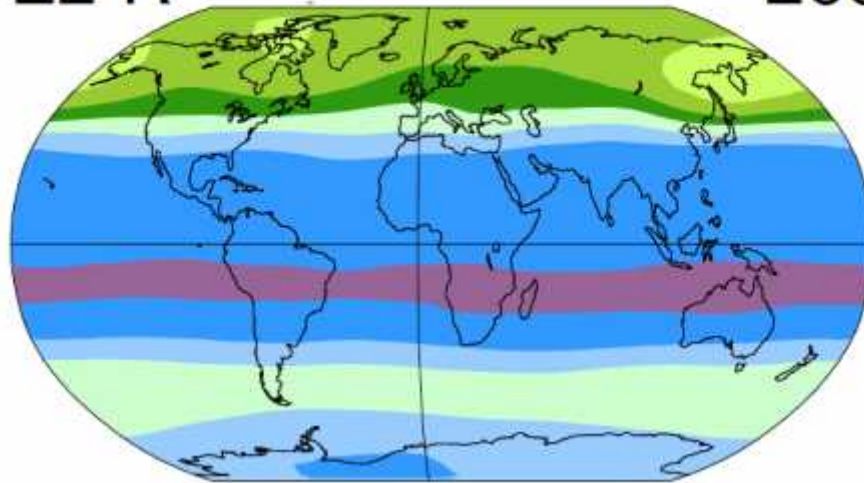


31.7

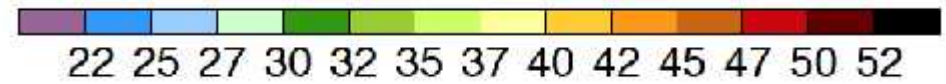
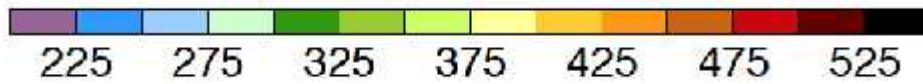
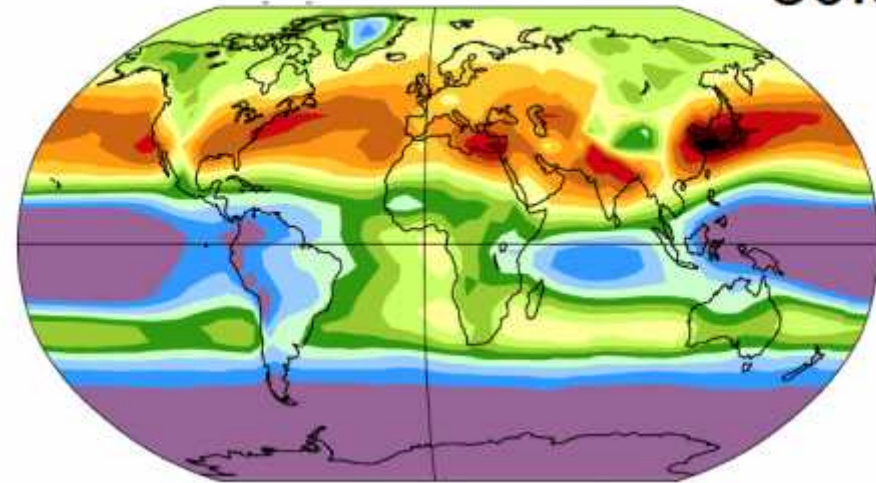


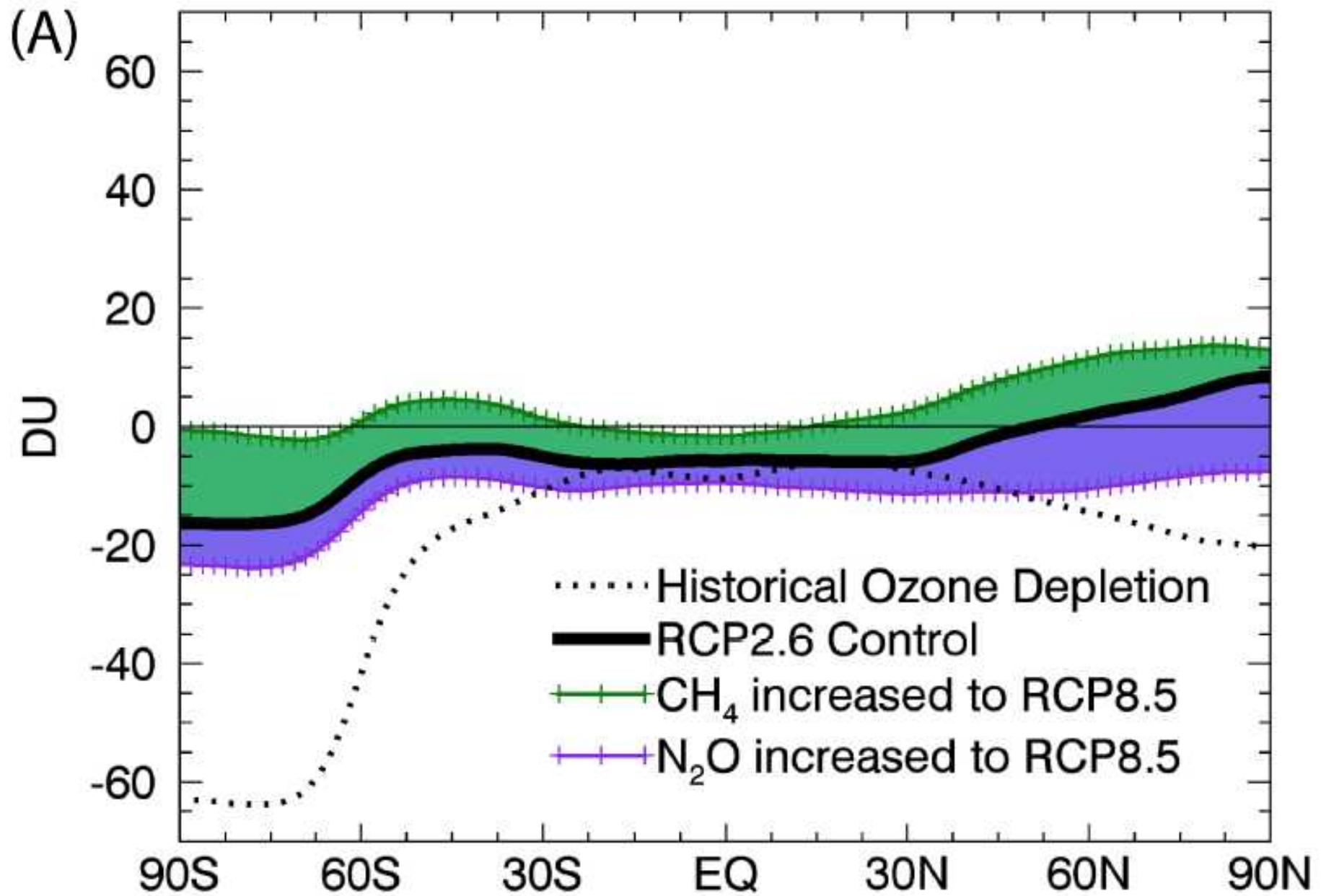
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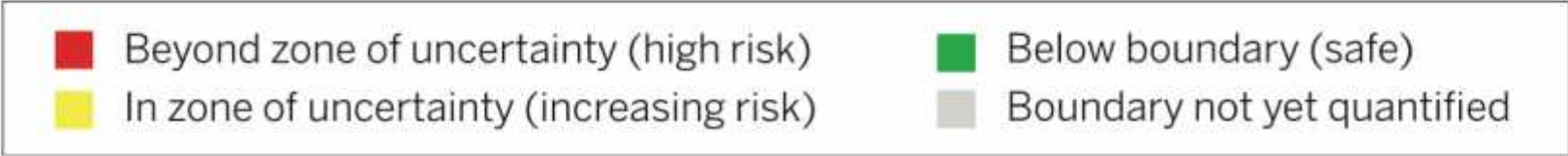
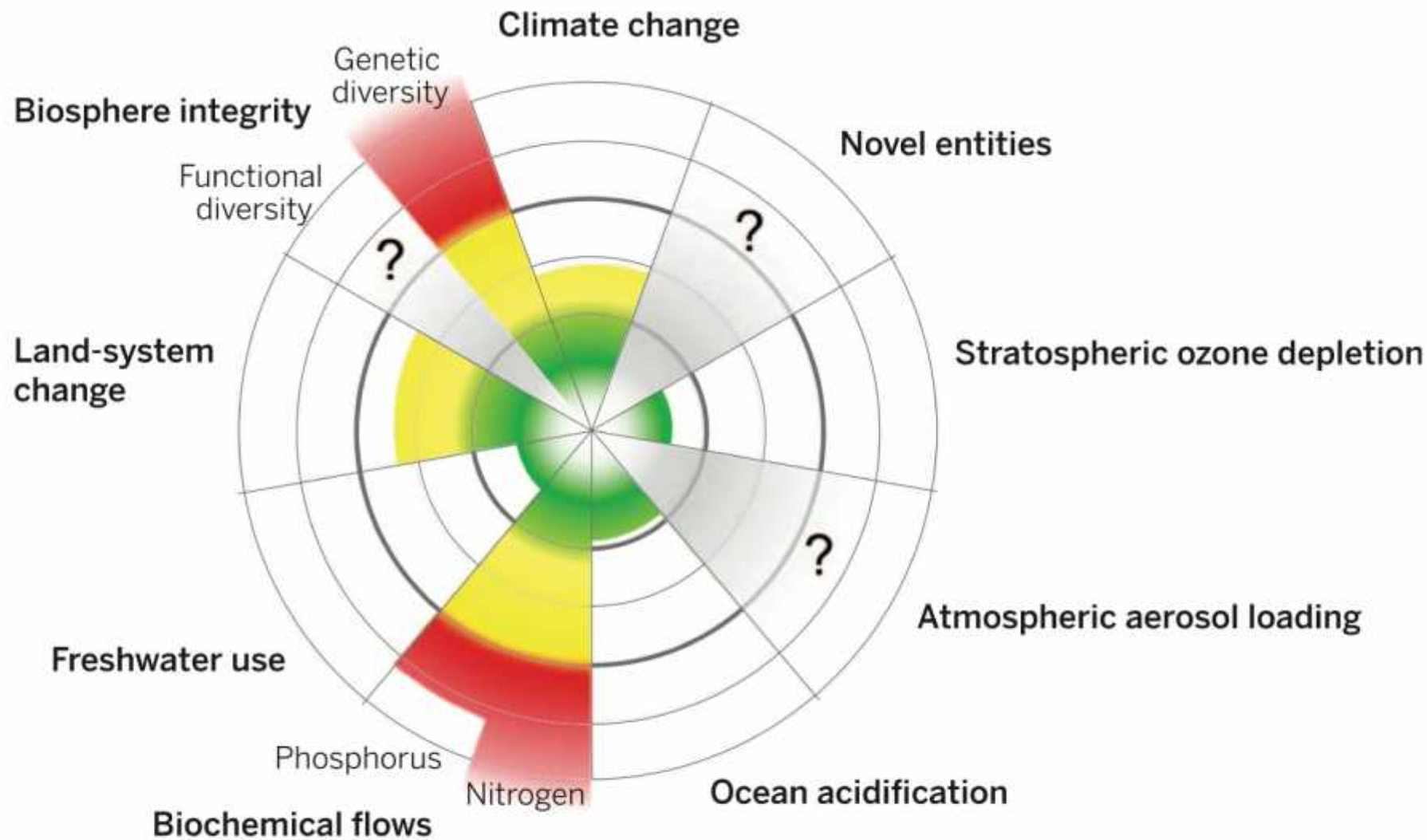
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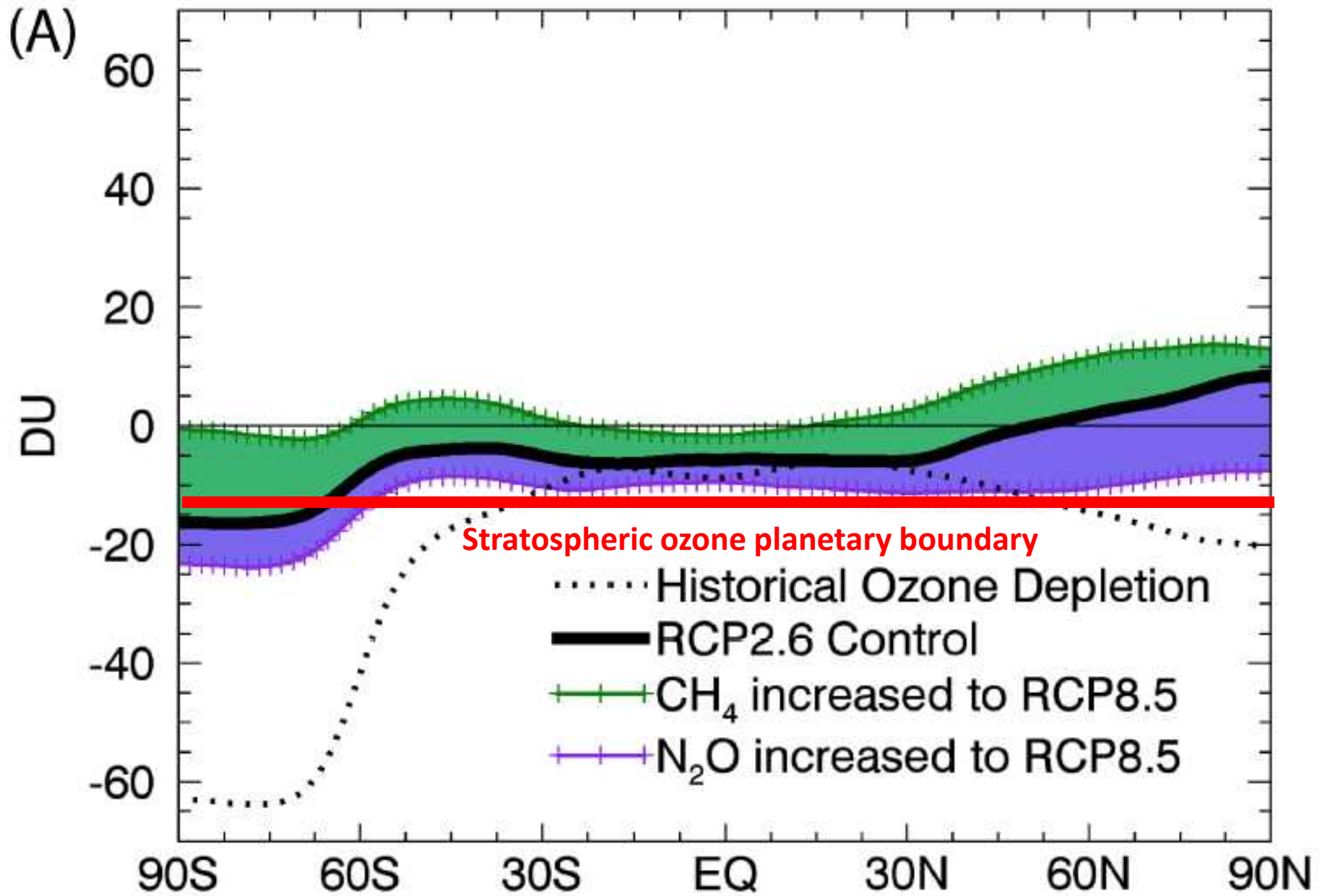


30.9





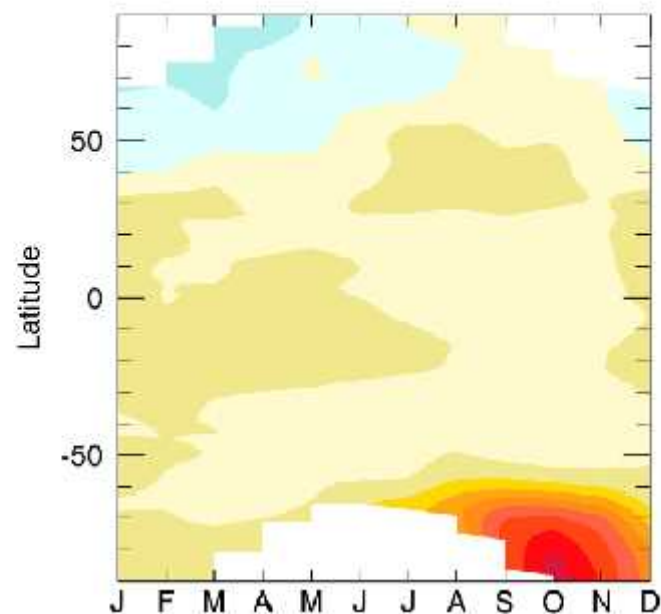




$N_2O = 344$  ppbv

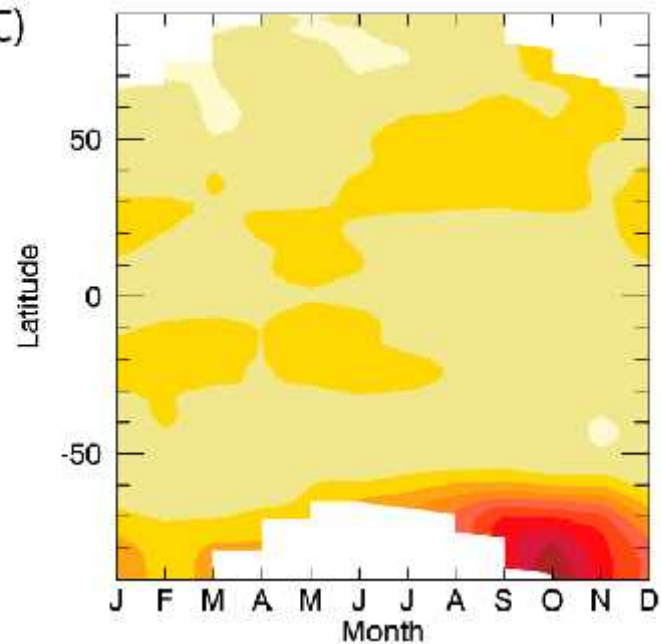
(A)

RCP 2.6

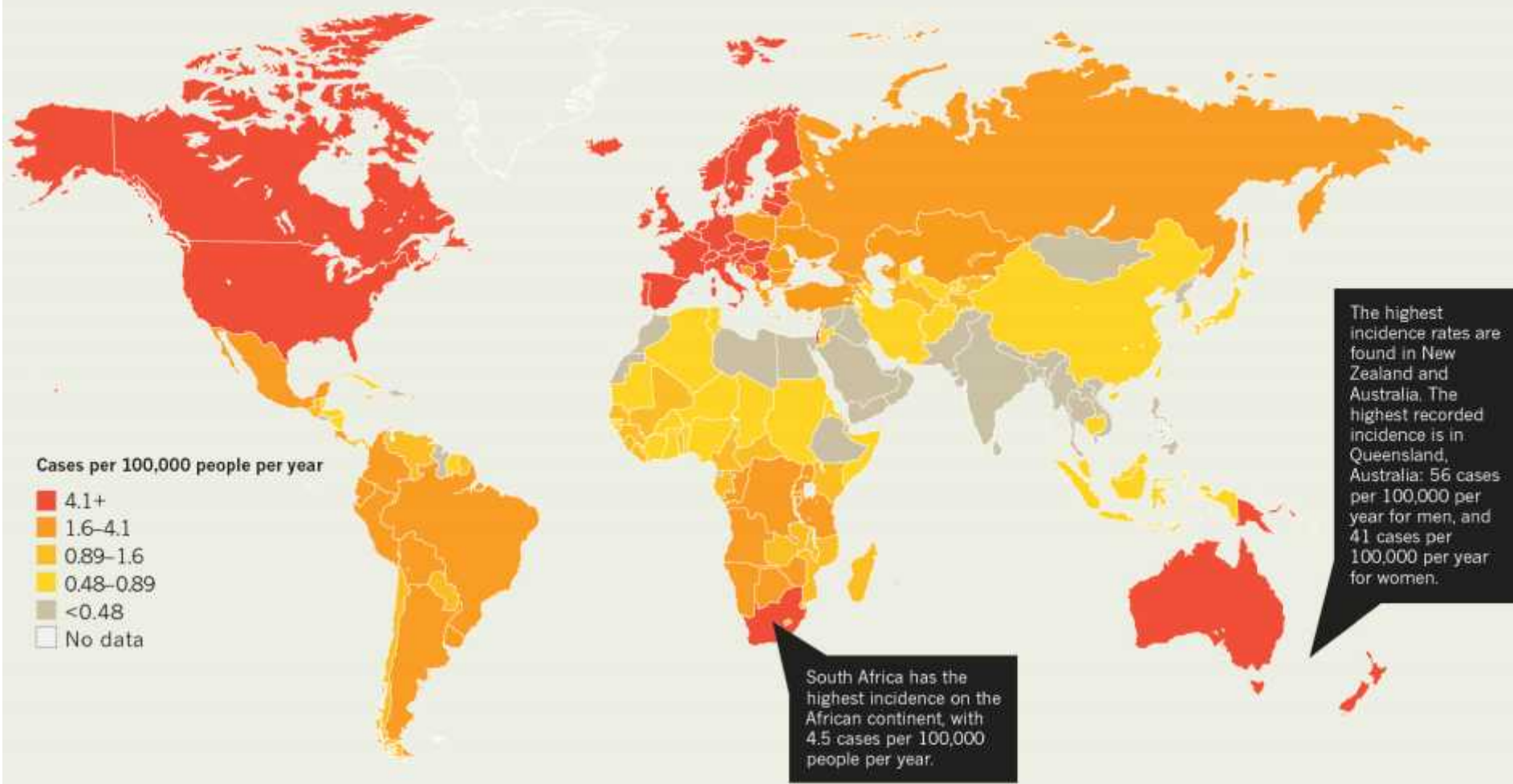


$N_2O = 428$  ppbv

(C)



# THE CANCER THAT RISES WITH THE SUN



# Conclusions

- $\text{N}_2\text{O}$ 's ozone destructiveness affected by a changing climate
- If climate policy focus is on  $\text{CO}_2$  and  $\text{CH}_4$ , but not  $\text{N}_2\text{O}$ , could be worst possible outcome for stratospheric ozone layer
- In this scenario, planetary boundary for stratospheric ozone could be exceeded in certain regions
- Highlights importance of “all-of-the-above” climate mitigation strategies